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**Section II. REMARKS**

The pending claims in the application are claims 1-5, 7-17, 19, 21 and 28-30.

**Claim Objections**

In the March 22, 2004 Office Action, the Examiner objected to the typographical error in claim 28, specifically the "14" at the end of the claim. Applicants have amended claim 28 to excise the inadvertent typographical error, thereby obviating this objection.

It is further noted that applicants have used the correct status identifiers in the present amendment, consistent with 37 C.F.R. §1.121.

**Rejection of Claims and Traversal Thereof**

In the March 22, 2004 Office Action:

claims 1-4, 7-17, 19, 21 and 28-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jin et al. (U.S. Patent No. 5,461,308) in view of Li et al. (U.S. Patent No. 5,487,356); and

claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Jin et al. in view of Li et al., and further in view of Vaartstra (U.S. Patent No. 6,010,969) and Biagini et al. (U.S. Patent No. 5,659,101).

These rejections are traversed in application to the claims as amended herein. The patentable distinctions of the amended claims over the cited references are set out in the ensuing discussion.

**Rejection under 35 U.S.C. §103(a)**

In the March 22, 2004 Office Action, claims 1-4, 7-17, 19, 21 and 28-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jin et al. (U.S. Patent No. 5,461,308) (hereinafter Jin) in view of Li et al. (U.S. Patent No. 5,487,356) (hereinafter Li). Applicants traverse such rejection.

According to the Examiner:

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"Jin et al. teaches a method of forming a magnetoresistive, doped manganate material . . . by a technique such as chemical vapor deposition . . . the manganate material having the general formula  $A_wB_xC_yO_z$ , where A is preferably La . . . B is preferably Mg, Ca, Sr, or Ba . . . C is preferably Mn . . .  $0.5 \leq w \leq 0.7$ ;  $0.15 \leq x \leq 0.50$ ;  $0.8 \leq y \leq 1.2$ ; and  $2.7 \leq z \leq 3.3$  . . . The materials taught by Jin et al. have a Curie temperature of greater than or equal to 330 K (i.e., a value within the applicant's claimed range) . . . [ ] Jin et al. does not explicitly teach that the A-site filling value (i.e., the sum of "w + x" as defined in Jin et al., or , in the applicant's claimed terms, the sum of "x + y" is between 0.5 and 0.9. However, *the ranges of "w" and "x" taught by Jin et al. lead to an A-site filling value of between 0.5 and 0.9, and thus the A-site deficient manganate material of applicant's claims.* [ ] Jin et al. does not teach the specifics of CVD process that is utilized to deposit the magnetoresistive manganate material . . . Li et al. teaches a method of forming a doped, magnetoresistive manganate film on a substrate from corresponding precursors . . . [ ] Therefore, it would have been obvious to one of ordinary skill in the art to deposit the A-site deficient manganate materials of Jin et al. by using the liquid deliver/flash vaporization CVD process of Li et al. . . ." (see June 24, 2003 Office Action, page 4, lines 14-20 through page 7, lines 1-2, which the Examiner cites in the March 22, 2004 Office Action as the reasoning for the present rejection) (underlining present) (italics added)

Applicants vigorously disagree.

Jin teaches a current sensor having a layer of magnetoresistive film of  $A_wB_xC_yO_z$  on a  $\text{LaAlO}_3/\text{Al}_2\text{O}_3$  substrate, where  $0.4 \leq w \leq 0.9$ ,  $0.1 \leq x \leq 0.6$ ,  $0.7 \leq y \leq 1.5$ , and  $2.5 \leq z \leq 3.5$ , and preferably A is La, B is Ca, Sr or Ba, and C is Mn. According to Jin, the "material should . . . have a ferromagnetic Curie temperature higher than the sensor operating temperature, preferably by at least 30°C. Thus, for room temperature operation, the material should have a Curie temperature  $\geq 330 \text{ K}$ " (see Jin, col. 3, lines 28-32).

In contrast, applicants' claimed invention relates to a method of depositing A-site deficient manganate material using MOCVD, wherein room temperature (and above) magnetoresistance is achieved in the A-site deficient doped manganate films (see instant disclosure, paragraph bridging pages 9 and 10). In other words, the A-site deficient manganate materials produced according to the method of claim 1 have Curie temperatures of 273 K to 324 K and as such, display magnetoresistive responses to relatively small magnetic fields (see instant disclosure, page 6, lines 6-7).

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Claim 1, as amended, recites:

**"A method of forming a doped A-site deficient manganate material on a substrate from corresponding precursor(s), comprising liquid delivery and flash vaporization thereof to yield a precursor vapor, transporting the precursor vapor to a chemical vapor deposition reactor for chemical vapor deposition formation of the manganate material on the substrate, said manganate material having a formula of  $\text{La}_x\text{M}_y\text{MnO}_3$ , where  $\text{M} = \text{Mg, Ca, Sr, or Ba}$ , and  $0.5 < (x+y) < 0.9$ , and wherein the manganate material has a Curie temperature that is between 273 K and 324 K."** (emphasis added)

Support for this amendment can be found in the instant specification at pages 17-18, Tables 1 and 2.

Notably, applicants' claimed Curie temperatures, i.e., 273 K to 324 K, no longer overlap the range disclosed in Jin (which was pointed out by the Examiner in the rejection). As discussed hereinabove, Jin **requires** that the magnetoresistive film have a Curie temperature higher than the sensor operating temperature, preferably by at least 30°C and **"for room temperature operation, the material should have a Curie temperature  $\geq 330$  K."** Clearly, Jin does not motivate, teach or suggest every limitation of applicants' claimed invention, specifically a manganate material having a Curie temperature that is between 273 K and 324 K.

In fact, Jin teaches away from a magnetoresistive film having a Curie temperature lower than 330 K by repeatedly stating that the magnetoresistive film **should** have a Curie temperature that is **at least 30°C** higher than the sensor operating temperature and for room temperature operation, the material **should** have a Curie temperature  $\geq 330$  K (i.e., room temperature = 25°C, therefore 25°C + at least 30°C = at least 55°C, which is at least 328 K).

Li does not cure the deficiencies of Jin. Li teaches A-site **stoichiometric** magnetoresistive films having the formula  $\text{La}_x\text{A}_{1-x}\text{MnO}_3$  and is devoid of any teaching or suggestion relating to the Curie temperature of the films. The significance of the A-site stoichiometric films of Li will be discussed further hereinbelow.

The Examiner stated that "the ranges of "w" and "x" taught by Jin et al. lead to an A-site filling value of between 0.5 and 0.9, and thus the A-site deficient manganate material of applicant's claims." Applicants vigorously disagree.

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Applicant's claimed compounds are not exemplified in Jin and the fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious. *In re Jones*, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992). *Jones* involved an obviousness rejection of a claim reciting specific compounds wherein a prior art reference disclosed a genus, which encompassed some of the claimed compounds. However, the *Jones* Court found that although the prior art reference encompassed a "potentially infinite genus," it did not disclose or suggest the claimed compounds. As such the rejection by the examiner for obviousness was reversed. This is the present situation and any broad statements in Jin regarding possible ranges for "w + x" does not render applicant's claimed compounds obvious because the presently claimed compounds are not specifically disclosed or suggested in Jin.

The Examiner further stated that "where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists," citing *In re Wertheim*, 191 U.S.P.Q. 90 (CCPA 1976), and *In re Woodruff*, 16 U.S.P.Q.2d 1934 (Fed. Cir. 1990) (see June 24, 2003 Office Action, page 5, lines 16-19, which the Examiner cites in the March 22, 2004 Office Action as the reasoning for the present rejection) (see also the citation to *In re Peterson*, 65 U.S.P.Q.2d, 1379, 1382-83 (Fed. Cir. 2003), as introduced in the March 22, 2004 Office Action at page 6, lines 19-20). Clearly, this line of reasoning is converse to that stated by the court in *Jones*, which begs the question, which ruling should be applied to the present case?

In view of the inconsistencies and in order to advance the presently pending claims to allowance, applicants hereby address the *Wertheim*, *Woodruff* and *Peterson* cases cited by the Examiner, with the intent of rebutting the Examiner's proclaimed *prima facie* case, which is supported by the court in *Peterson*:

"a prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness. That is not to say that the claimed composition having a narrower range is unpatentable. Rather, the existence of overlapping or encompassing ranges shifts the burden to the applicant to show that his invention would not have been obvious . . . [ ] In general, an applicant may overcome a *prima facie* case of obviousness by establishing "that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Geisler*, 116 F.3d at 1469-70, 43 U.S.P.Q.2d at 1365 (alteration in original) (quoting *In re Woodruff*, 919 F.2d at 1578, 16 U.S.P.Q.2d at 1936). [ ] Alternatively, an applicant may

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rebut a *prima facie* case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect. *In re Geisler*, 116 F.3d at 1469, 43 U.S.P.Q.2d at 1365 (quoting *In re Malagari*, 499 F.2d at 1303, 182 U.S.P.Q. at 553)." (emphasis added)

In other words, the Examiner's proclaimed *prima facie* case of obviousness may be rebutted by showing that the claimed range is critical or that the prior art teaches away from the claimed invention.

As discussed hereinabove, applicants' claimed Curie temperatures are critical because they facilitate widespread magnetoresistive applicability ranging from thin-film sensors to thermal switches, and the magnetoresistors respond to relatively small magnetic fields (see instant disclosure, page 6, lines 4-7). Applicants reported that a manganate material having the limitations disclosed in claim 1 displayed a magnetoresistive response that is the highest reported to date in small magnetic fields (see instant disclosure, page 8, lines 18-27). By the Examiner's own admission, "the Curie temperature of a material is simply a function of its composition and stoichiometry" (see March 22, 2004 Office Action, page 7, lines 20-21 through page 8, line 1) and as such, the stoichiometric range claimed by applicants is critical to applicants' claimed manganate material.

Additionally, as introduced hereinabove, Jin teaches away from going in the direction of applicants' claimed invention by repeatedly stating that the magnetoresistive film should have a Curie temperature that is at least 30°C higher than the sensor operating temperature and for room temperature operation, the material should have a Curie temperature  $\geq 330$  K. As such, the Examiner's *prima facie* case of obviousness cannot stand.

It is noted that the *Wertheim*, *Woodruff* and *Peterson* cases all involved claims rejected for reciting a narrow range, which was selected from within a somewhat broader range disclosed in a prior art reference. In other words, there were no additional limitations in the disputed claims which distinguished said claims from the prior art. Considering the facts, *Wertheim*, *Woodruff*, and *Peterson* do not apply to the present situation because applicants' claimed invention recites additional limitations which define over the Jin and Li references, specifically a manganate material having a Curie temperature between 273 K and 324 K.

The Examiner, responding to the arguments submitted by applicants in response to the June 24, 2003 Office Action, stated:

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“even assuming, *arguendo*, that Jin does not explicitly teach the applicant’s claimed Curie temperature limitation, the composition of the manganate material taught (or at least reasonably suggested by Jin) is identical to the manganate material of the applicant’s claims. Therefore the A-site deficient manganate films taught by Jin would inherently have a Curie temperature in the range claimed by the applicant (i.e., because the compositions/stoichiometry of the films are the same, and the Curie temperature of a material is simply a function of its composition and stoichiometry).” (see March 22, 2004 Office Action, page 7, lines 14-21 through page 8, line 1) (emphasis added)

Applicants respectfully disagree with the Examiner’s reasoning because the Examiner has disregarded a very important aspect of the Jin reference - the material disclosed in Jin should have a Curie temperature that is at least 30°C higher than the sensor operating temperature and for room temperature operation, the material should have a Curie temperature  $\geq 330$  K. By the Examiner’s own admission, “the Curie temperature of a material is simply a function of its composition and stoichiometry.” As a result, because the Curie temperatures are dissimilar, the magnetoresistive film of Jin will NEVER logically have the stoichiometry claimed by applicants herein.

The combination of Jin and Li does not cure this deficiency. As introduced hereinabove, the films of Li have the formula  $\text{La}_x\text{A}_{1-x}\text{MnO}_3$  and as such, are not A-site deficient and concomitantly cannot have a Curie temperature between 273 K and 324 K, as claimed by applicants herein.

Furthermore, there is no motivation, teaching or suggestion to modify the proposed combination of Jin or Li to yield applicants’ claimed invention. “The prior art must provide one of ordinary skill in the art the motivation to make the proposed molecular modifications needed to arrive at the claimed compound.” *In re Lahu*, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) (citing *In re Steniski*, 170 U.S.P.Q. 343, 347 (CCPA 1971); *In re Taborsky*, 183 U.S.P.Q. 50, 55 (CCPA 1974); *In re Murch*, 175 U.S.P.Q. 89 (CCPA 1972); *In re Fay*, 146 U.S.P.Q. 47 (CCPA 1965)).

In the present case, neither reference suggests the criticality of a film having a Curie temperature between 273 K and 324 K, with its corresponding A-site deficient stoichiometry. Specifically, Li teaches the formation of stoichiometric A-site compounds and Jin discloses an infinite number of possible compounds with the **requirement** that the magnetoresistive film have a Curie temperature that is at least 30°C higher than the sensor operating temperature and for room temperature operation, the material **should** have a Curie temperature  $\geq 330$  K. Applicants query, where is the motivation in the prior art to make the molecular modifications claimed by applicants herein? Clearly, there is none.

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In conclusion, because the combination of Jin and Li does not teach each and every limitation of applicants' claimed invention, because Jin teaches away from going in the direction of applicants' claimed invention, and because there is no motivation in either reference to make the proposed molecular modifications, applicants' claims 1-4, 7-17, 19, 21 and 28-30 are not *prima facie* obviousness. Applicants respectfully request withdrawal of the §103 rejection based on Jin in view of Li.

In the March 22, 2004 Office Action, claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Jin in view of Li, and further in view of Vaartstra (U.S. Patent No. 6,010,969) and Biagini et al. (U.S. Patent No. 5,659,101) (hereinafter Biagini). Applicants traverse such rejection.

According to the Examiner, it would have been obvious to one of ordinary skill in the art to utilize metal pivalate Lewis base adducts as taught by Vaartstra as precursors in the CVD process of the Jin et al. and Li et al. combination (see June 24, 2003 Office Action, page 12, lines 13-16, which the Examiner cites in the March 22, 2004 Office Action as the reasoning for the present rejection). Applicants vigorously disagree.

Vaartstra relates to a method of vaporizing a carboxylate complex precursor and directing it toward a substrate, using a CVD technique, to form metal- or metalloid-containing oxides, sulfides, selenides, tellurides, nitrides or combinations thereof. Vaartstra does not specifically disclose any of the CVD formed metal- or metalloid-containing compounds.

Biagini relates to a ternary catalytic system, based on lanthanides, for the polymerization of dienic monomers.

As discussed hereinabove, the combination of Jin and Li fails to motivate, teach or suggest applicants' claimed invention, specifically a manganate material having a Curie temperature between 273 K and 324 K and the critical corresponding stoichiometry of the manganate material. The inclusion of Vaartstra and Biagini does not cure this deficiency.

For example, Vaartstra does not expressly indicate which metal- or metalloid-containing compounds are preferably formed using the carboxylate complexes disclosed therein, much less disclose the deposition of A-site deficient manganate materials having a Curie temperature between 273 K and 324

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K.

Biagini merely discloses  $ML_3$  compounds, where M is a metal with an atomic number between 57 and 71 and L can be acetylacetonate or hexafluoroacetylacetonate. There is no motivation or suggestion that these compounds may be used to deposit A-site deficient manganate materials having a Curie temperature between 273 K and 324 K. Clearly, there is no basis for combining Jin and Li with either Vaartstra or Biagini in any logical or straightforward manner that would in any way yield or extrapolate to applicants' claimed invention.

Additionally, it is to be noted that Biagini is non-analogous art. As stated by the court in *In re Oetiker*, 24 U.S.P.Q.2d 1443, 1445 (Fed. Cir. 1992),

“[i]n order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.”

The Biagini reference, which teaches a ternary catalytic system for the polymerization of dienic monomers, is clearly NOT in the field of applicants' endeavor. The field of polymerization in the presence of catalysts is not even marginally pertinent to the chemical vapor deposition art. Accordingly, there are no grounds for relying on the Biagini reference as a basis for the rejection of applicants' claims.

Considered separately, or in combination, the tertiary references Vaartstra and Biagini do not cure the deficiencies of Jin and Li, and do not in any way motivate, teach or suggest applicants' claimed invention. Applicants therefore request withdrawal of the §103(a) rejection of claim 5 based on Jin in view of Li, and further in view of Vaartstra and Biagini.

#### **Petition for Extension of Time and Fees Payable**

Petition hereby is made under the provisions of 37 C.F.R. §1.136(a) for a two (2) month extension of time for response to the March 22, 2004 Office Action in this application, extending the deadline for response from June 22, 2004 to August 23, 2004 (in consequence of the fact that August 22, 2004 is a Sunday).



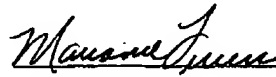
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The fee of \$420.00 specified in 37 C.F.R. §1.17(a)(2) for such two (2) month extension is authorized to be charged in the attached credit card authorization form. Authorization also is hereby given to charge any additional fee or amount properly payable in connection with this extension request to Deposit Account No. 08-3284 of Intellectual Property/Technology Law.

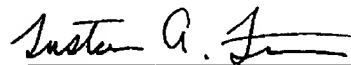
### CONCLUSION

Applicants have satisfied all the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §112. It therefore is requested that Office reconsider the patentability of the pending claims in light of the distinguishing remarks herein and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Markham is requested to contact one of the undersigned attorneys at (919) 419-9350 to resolve same.

Respectfully submitted,



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